Technical Memorandum

SA1-A Contaminated Sediment Removal Operations
Portage Creek Area Removal
Kalamazoo, Michigan

Prepared for:

USEPA Region 5
Emergency Response Branch
77 West Jackson
Chicago, IL 60604

Prepared by:

Environmental Quality Management, Inc.
1800 Carillon Boulevard
Cincinnati, Ohio 45240

September 2013

Technical Memorandum
for
SA1-A Contaminated Sediment
Removal Operations
Portage Creek Area Removal
Kalamazoo, Michigan

Prepared for:

USEPA Region 5
Emergency Response Branch
77 West Jackson
Chicago, IL 60604

Contract No. EP-S5-08-02
Task Order No. 0087

Prepared by:

Environmental Quality Management, Inc.
1800 Carillon Boulevard
Cincinnati, Ohio 45240
(513) 825-7500
Fax (513) 825-7495
www.eqm.com

EQ PN: 030281.0087

Revision 1
September 2013

CONTENTS

ATTACHMENTS

Attachment A Figures

FIGURES

TABLES

1. INTRODUCTION

Environmental Quality Management, Inc. (EQ) has been tasked with performing a time-critical-removal action (TCRA) to remove polychlorinated biphenyl (PCB) contaminated sediments from targeted locations over a 1.8-mile section of Portage Creek. The Portage Creek Area Site (Site) is a portion of the Allied Paper/Portage Creek/Kalamazoo River Superfund Site. Located in Kalamazoo County, Michigan, this site is pervasively contaminated with PCBs as a result of historic waste practices associated with several paper mills. The Site was listed on the National Priorities List (NPL) on August 30, 1990. The Portage Creek Site is located in the City of Kalamazoo, Michigan, beginning at East Cork Street and extending northward approximately 3 miles to the confluence of the Kalamazoo River. Activities associated with this removal action are anticipated to occur in segments along a 1.8-mile stretch of Portage Creek. Work activities will move downstream primarily between Reed Avenue to East Walnut Street bridge, South Pitcher Street bridge to the railroad crossing west of Rochester Street, and the bend in Portage Creek east of Rochester Street to the confluence with the Kalamazoo River (Figure 1, Site Location Map, Attachment A).

A comprehensive description of the project is provided in the Work Plan (composed of sediment removal area technical memorandums and other site documents) for the Portage Creek Area Time-Critical Removal Action. The section of Portage Creek targeted for action has been divided into 10 distinct removal areas (Figure 2, Sediment Removal Areas, Attachment A). The areas targeted for removal will be referred to as SA1-A, SA1-B, SA1-C, SA3-A, SA5-A, SA5-C, Axtell Creek, SA5-D, SA6, and SA7. This technical memorandum will focus on establishing support facilities and contaminated sediment removal operations in the SA1-A Area. Approaches described in this technical memorandum supersede all other removal approaches discussed to date in related submittals.

2. PROJECT PREPARATION

EQ performed the following activities to prepare the Portage Creek Area Site for contaminated sediment excavation in SA1-A.

2.1 Pre-excavation Sampling of Data Gap Area SA1-A

2.1.1 Sampling

EQ conducted sampling at dredging area SA1-A on May 1, 2013 to further define the extent of contamination and to finalize the removal depths required. Grids 1 through 9 of SA1-A were sampled to verify removal depth and extent of excavation.

2.1.2 Analyses

Samples were analyzed for total PCBs by ALS Global of Holland, Michigan. Sampling results are summarized in Table 1.

Sampling results for SA1-A indicated that several grids exceeded cleanup criteria to a depth of 29 inches. All grids in SA1-A will be excavated to a depth of 36 inches to ensure contaminants are removed.

Analyses from this and previous sampling events indicated that sediment contaminant levels for PCBs were above TSCA disposal limits in Grids 2, 3, 4, 5 & 6, and will therefore be disposed of in a TSCA-approved landfill. Analyses in all other grids indicated that sediment contaminant levels for PCBs were below TSCA disposal limits, and would be acceptable for Subtitle D landfill disposal.

Table 1. SA1-A Pre-Removal Sampling Results

Area	Grid	Interval	Analytical Result, mg/kg
SA1-A	1	0-12 in.	7.21
		12-24 in.	ND
	2	0-12 in.	1.09
		12-27 in.	12.8
		12-27 in. (duplicate)	59.70
	3	0-12 in.	1.15
		12-24 in.	0.86
		24-31 in.	0.56
	4	0-12 in.	ND
		12-24 in.	0.81
		12-24 in. (duplicate)	1.16
		24-31 in.	0.78
	5	0-14 in.	1.20
		12-24 in.	0.32
		24-35 in.	ND
	6	0-12 in.	ND
		12-24 in.	ND
		24-39 in.	ND
	7	0-12 in.	1.61
		12-24 in.	6.58
		24-31 in.	1.08
	8	0-12 in.	0.475
		12-24 in.	1.06
		24-29 in.	11.79
	9	0-12 in.	0.84
		12-25 in.	1.77

ND = Not Detected

3. SA1-A CONTAMINATED SEDIMENT REMOVAL

The SA1-A dredging area is located along parcels of properties at 412, 418 and 424 Harrison Street (west bank), and Veteran's Memorial Park (east bank), along E. Michigan Avenue between Harrison Street and King Highway (Business 94). SA1-A is subdivided into nine grids. The sediment removal depth for the SA1-A removal area extends to 36 inches below the existing creek bottom, which includes an estimated 6 inches of over-dredge depth.

The overall surface area to be excavated and dredged in SA1-A is anticipated to be approximately 18,324 ft². The approximate overall dimensions are approximately 300 ft long with an average width per excavation area segment of 47 ft. EQ will dredge sediments at SA1-A requiring both non-TSCA disposal at a Subtitle D Landfill (approximately 1,235 yd³) and TSCA disposal at a TSCA Landfill (approximately 1,035 yd³). Table 2 presents excavation details.

Table 2. SA1-A Excavation Details

Grid	Dimensions, ft	Removal Depth, in.	Surface Area/Volume of Subtitle D Soils	Surface Area/Volume of TSCA Soils
SA1-A1	41 ft W by 53 ft L	30	2,175 ft² / 201 yd³	0 ft² / 0 yd³
SA1-A2	45 ft W by 48 ft L	48	0 ft² / 0 yd³	1,862 ft² / 207 yd³
SA1-A3	41 ft W by 54 ft L	42	0 ft² / 0 yd³	2,142 ft² / 238yd³
SA1-A4	77 ft W by 27 ft L	42	1,129 ft² / 146 yd³	1,105 ft² / 143 yd³
SA1-A5	98 ft W by 24 ft L	42	1,074 ft²/ 139 yd³	1,065 ft² / 138 yd³
SA1-A6	35 ft W by 90 ft L	30	0 ft² / 0 yd³	2,167 ft² / 201 yd³
SA1-A7	22 ft W by 87 ft L	60	1,852 ft² / 343 yd³	0 ft² / 0 yd³
SA1-A8	28 ft W by 75 ft L	36	2,090 ft² / 232 yd³	0 ft² / 0 yd³
SA1-A9	27 ft W by 67 ft L	30	1,862 ft² / 172 yd³	0 ft² / 0 yd³

3.1 Pre-Sediment Removal Preparation

3.1.1 Waste Characterization Sampling Soil

EQ collected characterization soil samples during the May 2, 2013 sampling event previously described. Sampling was performed in compliance with the revised EQ Field Sampling Plan

(FSP) (Revision 1, June 2012) that provided information on the number of samples, collection method, and exact analyses to be performed. The soils were analyzed for landfill disposal parameters.

3.1.2 Pre-Sediment Removal Condition Assessment

EQ provided a structural engineer to perform a pre-sediment removal assessment of constructed features in and adjacent to the creek channel excavation areas. Details of this assessment are provided in a report entitled "Pre-Sediment Removal Structure Feature Assessment Removal Areas SA1-A, SA1-B and SA1-C" dated May 2013 prepared by Fleis and Vandenbrink Engineering Inc. The report identifies the structural features in the SA1-A through SA1-C work areas. Table 3 present the structural features for SA1-A and SA1-B (low-priority removal area where the By-pass Pump Station will be located). Table 4 presents the potential impact of the constructed features of SA1-A on dredging operations.

3.1.3 Indiana Bat Study

In the Soil Erosion and Sedimentation Control Plan (revision 1, May 2013), EQ identified work areas along Portage Creek that provide a potential habitat for the endangered Indiana Bat. Between April 1st and October 15th, the plan restricts clearing and grubbing of large dead and/or dying trees with loose bark that are a potential nursery habitat for the Indiana Bat. Therefore, EQ will have an Indiana Bat Survey performed prior to performing clearing and grubbing activities to facilitate dredging infrastructure installation.

The work area requiring the Indiana Bat Survey is located between the intersection of Harrison Street and Michigan Avenue and the intersection of Michigan Avenue and King Highway.

Table 3. SA1-A Constructed Features

Report Designation	Location	Constructed Features
SA1-B7	• 5 ft from top of west creek bank along 600 East Michigan Ave. bldg.	• Utility pole with overhead cables
SA1-B8 & B9	• SW of Michigan Avenue Bridge. • SW of Michigan Avenue Bridge, approximately 12 ft west from top of bank. • Approx. 100 ft south of Michigan Avenue Bridge extending from east bank. • West bank of creek, SW of Michigan Avenue Bridge. • East bank of creek, SE of Michigan Avenue Bridge. • Between SA1-B9 and SA1-A1. • SW and SE of Michigan Avenue Bridge. • East and west from both north and south side of Michigan Avenue Bridge.	• Building • Billboard structure • Steel pipe outlet • Concrete rubble wall (West Bank) • Concrete rubble wall (East Bank) • Michigan Avenue bridge • One 12-in. and one 24-in. storm water outlet • Underground 4-in. gas main • Underground electric cable • 16-in. water force main
SA1-A1	• East bank approx. 20 ft north of Michigan Avenue Bridge.	• 12-in. concrete storm water outlet w/headwall
SA1-A2	• West bank of creek, east of bldg located at 412 Harrison Street	• A series of 3 monitoring wells (MWs)
SA1-A3 to SA1-A4	• West bank	• 412 & 418 Harrison St. bldg
SA1-A5	• West bank	• 10-ft-diameter concrete storm water outlet
SA1-A6 to SA1-A9	• West bank • Across creek	• 6-in. PVC outlet with field stone spillway • Pedestrian bridge

Table 4. SA1-A Impact of Constructed Features on Dredging Operations

Constructed Feature	Designation	Impact/Protective Measure
• Utility pole	SA1-B7	• Utility Company temporarily remove pole & guy wire.
• Building • Billboard structure • Steel pipe outlet • Concrete rubble wall • Concrete rubble Wall • Michigan Avenue Bridge • Two 12-in. storm sewer outlets • Underground 4-in. gas main • Underground electric • 16-in. water force main	SA1-B8 & B9	• No impact to operations outside work area. • Pipe is severely deteriorated and is believed to serve no current purpose because former buildings on associated property have been demolished and removed. • No sheet pile will be located within 3 to 4 ft of concrete rubble wall (east or west); sheet pile for the dam will be installed upstream of the concrete rubble wall. • Maintain a 20-ft No-Impact zone upstream and downstream from the bridge, where no sheet pile driving or excavation will occur. However, by-pass discharge lines will be routed under the bridge. • Maintain a 20-ft No-Impact zone upstream and downstream from the bridge (see above) to maintain safe working distance from underground utilities and storm water outlets.
• 12-in. storm water outlet w/headwall	SA1-A1	• Install stakes 2 to 3 ft out from the outlet and cordon off the area with caution tape to maintain a safe distance.
• Three monitoring wells	SA1-A2	• Determine operational status; remove, if possible, or paint aboveground well protectors with orange paint to increase visibility and maintain safe working distance.
• 412 Harrison Street building	SA1-A3 to SA1-A4	• Maintain safe distance when clearing and grubbing; use rigging when felling large trees to direct them away from the building.
• 10-in.-diameter concrete storm water outlet	SA1-A5	• Cordon off with construction fencing and posts to maintain 3-in. buffer zone from exposed concrete pipe outlet.
• 6-in. PVC outlet with field stone spillway • Pedestrian bridge/Associated sidewalk & boardwalk • Split rail fence and ornamental vegetative beds • Flush-mount monitoring well • Pedestrian traffic control sign	SA1-A6 to SA1-A9	• Remove field stone as needed to allow access to dredge upstream of pedestrian bridge, and stockpile stone in remote area on site for future restoration; cordon off with construction fencing and posts to maintain 3-ft buffer zone from exposed concrete pipe outlet. • Close bridge and associated sidewalk/boardwalk during operations; remove section of boardwalk and relocate it to a remote and safe location until restoration is complete; use spotters w/radios when excavating beneath bridge. • Remove fencing and plantings as needed for access and relocate to remote and safe location; Place vegetative materials in mulch bed and water regularly. • Cordon off with construction fencing and posts to maintain 3-ft buffer zone. • Remove signage for access and relocate to a remote and safe location for subsequent reinstallation.

The overall work area is divided into two sections north and south of Michigan Avenue. The section south of Michigan Avenue is bounded on the west by Portage Creek and a parcel of property at 646 Michigan Avenue to the east. The section north of Michigan Avenue includes:

- The western portion of Veteran's Memorial Park at 645 Michigan Avenue.
- The eastern side of the property located at 412 & 418 Harrison Street.

The northern area is approximately 0.73 acre and the southern area is approximately 0.17 acre.

EQ will subcontract an ecological consulting firm to provide:

- A Qualified Biologist(s) who holds a U.S. Fish and Wildlife Service (U.S. FWS) Recovery Permit for Indiana bats and is certified by the Michigan Department of Natural Resources (MDNR) to net and handle Indiana bats. The Qualified Biologist shall follow U.S. FWS 2013 Revised Range-Wide Indiana Bat Summer Survey Guidelines.
- A Desktop and Field Based Habitat Assessment to determine if a suitable summer habitat is present within the removal action area, and what potential effect the project will have on the area.
- An Acoustic Survey of the Project Work Area per previously referenced guidelines.

A survey report will present the findings of the habitat assessment and acoustical survey. This report will be used to determine clearing and grubbing guidelines.

3.1.4 Clearing and Grubbing of Access Road and Excavation Area

Clearing and grubbing will be performed in July/August 2013 along the east and west banks of the creek to open access to the dredging area, subsequent to the completion of the Indiana Bat Survey. Clearing and grubbing of trees will be limited to those trees not suitable for nursery habitat for the Indiana Bat. Figure 3, Area SA1-A Dredging Area Site Infrastructure, depicts the access road route as well as other site infrastructure features. Clearing and grubbing will only be performed along the creek channel banks.

The SA1-A access route to the staging area does not require clearing and grubbing because access is through the parking lot of the building located at 424 Harrison Street. The access route to SA1-A extends from Harrison Street through the parking lot at 424 Harrison Street adjacent to the west side of the slope area. Limited clearing and grubbing work will be performed in July

2013 to facilitate access to the discharge area for the bypass pumping system in SA1-A on the north bank of Veteran's Memorial Park.

EQ will perform all clearing and grubbing in a manner that protects the root mass in the overall work area to maintain soil stability. Tree tops and tree trunks will be handled as described in the EQ Debris Management Plan dated September 2011.

3.1.5 Environmental Controls

EQ will install environmental controls in accordance with the requirements established in the revised EQ Sedimentation and Erosion Control Plan (Revision 1, May 2013). These environmental controls will include the following Best Management Practices (BMPs):

- Construction Exits—EQ will install a construction entrance at 424 Harrison Street just south of the railroad tracks as depicted in Attachment A, Figure 3. Installed construction exits will consist of a 6-inch-thick layer of 1- to 3-in. rock. The construction entrance/exit will be approximately 15 ft wide.
- Tire Wash Station—EQ will install and operate a portable tire wash station(s) between the support area and the entrance for the construction exits described above. After each truck is loaded with exhumed sediment, laborer(s) equipped with high-pressure water washer(s) will spray off the dirt from truck tires as they pass through the portable tire wash station prior to exiting the site. Wash waters will periodically be pumped to a temporary storage tank and trucked to the waste water treatment plant to maintain suitable storage capacity. Additional periodic maintenance may be required to remove sediment accumulations, which will be solidified and loaded into transfer trucks to be shipped to the John Street TCRA staging pad.
- Paved Surface Management—EQ will provide a power broom with a water tank to perform housekeeping of any paved work areas.
- Dust Control—EQ will provide a water truck for dust control for the mixing area and truck route.
- Fuel Station—EQ will fuel the heavy equipment in the support area depicted in Attachment A, Figure 3, Site Infrastructure. A 300-gallon temporary fuel tank with secondary containment will be stationed at this location. Two 1000-gallon temporary fuel tanks with secondary containment will be stationed adjacent to the bypass pump. EQ will also provide emergency spill control kits that will include drums, oil dry, adsorbent pads, and a boom that will be staged adjacent to the designated fueling areas to address small spills.
- Sediment Curtain—EQ will install one or more Type II sediment curtains downstream of the sediment removal operations perpendicular to the stream flow. Additional curtain(s) will be installed downstream of the cofferdams and bypass pumping discharge pads.

- Silt Fence—EQ will install a silt fence at the bottom of the slopes along both sides of the creek subsequent to completion of excavation activities to stabilize sediments until vegetation is re-established.
- Mulch Blanket—EQ will install additional mulch blanket as needed.
- Rock Discharge Pads—When EQ isolates an excavation area, bypass pumping will be required to maintain creek flow. EQ will isolate the entire SA1-A dredging area by installing one coffer dam upstream and one downstream. EQ will install one or more rock discharge pads downstream of each isolated section through which the discharge lines of the various bypass pumps will be directed to release their water. The rock discharge pads will be filled with rip-rap stone to dissipate discharge velocity.
- Turbidity Monitoring Station—EQ will establish turbidity monitoring station(s) to monitor the turbidity levels during removal operations. Real-time turbidity monitoring will be performed with stations set in the Kalamazoo River 300 ft upstream, 200 ft downstream, and 300 ft downstream of the downstream cofferdam. Turbidity monitoring will be recorded on half-hour intervals by a programmed data logger at the turbidity station. Other readings may be collected based on field conditions such as the presence of visible runoff to the creek in the work vicinity, or as part of mitigation measures. Data will be transferred to a computer in the EQ command post trailer via a cellular modem. Further details concerning turbidity monitoring and corrective action measures are presented in EQ's FSP for Portage Creek Removal Area (Revision 1, June 2012).

Additional environmental controls will be implemented as needed to supplement pre-construction controls as work progresses and site features are impacted by the sediment remediation activities.

3.1.6 Access Road Construction

EQ only needed to make minimal improvements to construct the access road to the SA1-A staging area.

3.1.7 Dredging Area Isolation

EQ will install utilize sheet pile cofferdams to isolate the SA1-A dredging area and facilitate dewatering to permit "dredging-in-the-dry" of the contaminated sediments. The location of the downstream coffer dam is depicted in Attachment1, Figure 3, Site Infrastructure.

The cofferdams will be built to an elevation approximately 6 inches above the average creek water level. The height has been specified by USEPA to allow storm water overflow into the

isolated excavation area in case of bypass pump failure and/or a storm event in order to prevent upstream flooding due to sediment removal operations.

3.1.8 Bypass Pumping

Creek channel bypass pumping will consist of capturing the stream flow from the creek from above the upstream isolation cofferdam and pumping it past the downstream isolation cofferdam and discharging captured creek waters on a rock discharge pad installed by EQ. The subcontractor will be required to provide redundant pumps and ancillary equipment to allow for maintenance of the pumping systems without impacting dredging operations. There may be exceptions to this specification during bypass pumping around isolated areas where suitable work space is unavailable to operate multiple 18-inch discharge lines. Bypass pumping operations will be described in the subsequent water management subsection. The bypass pumping systems will be installed prior to installation of the upstream/downstream isolation cofferdam. Attachment A, Figure 3, Site Infrastructure, depicts the location of the bypass pumps and discharge piping.

3.1.9 Dredging Area Dewatering

EQ will provide a dewatering subcontractor to perform isolated dredging area dewatering. The subcontractor will install a series of PVC sipper wells with a jetting probe. The sipper wells will consist of PVC tubes on approximate 5-foot centers jetted to an approximate depth of 10 feet below the creek bottom surface. Tubing will connect the sipper wells to a manifold pipe. The manifold pipe will be connected to a vacuum pump that discharges into a pipeline that transfers recovered water past the downstream isolation cofferdam onto the same discharge pads as the bypass pumping system. A vacuum will be placed on the sipper wells to extract water from the sediment. Several days of pumping will be permitted prior to the start of dredging to remove the maximum amount of moisture from the sediments prior to dredging. The sipper wells and manifold system will be installed along the east and west banks as well as down the creek channel center of SA1-A. This will facilitate sediment removal with minimal solidification at the removal area. Minimizing water content in sediment has the following benefits:

- Requires less solidification material, thus lowering the purchase cost of solidification material and dust control issues associated with solidification.
- Decreases water weight in sediment, thus reducing disposal cost by reducing disposal tonnage.
- Decreases volume of solidification material, thus decreasing waste volume and tonnage disposal costs.

The end result is a cost and safety benefit.

3.1.10 Pre-Excavation Topographic Survey

EQ coordinated with the EPA FIELDS Group to perform a pre-excavation survey of the removal area to fill in data gaps not captured when surveying the transect lines. This survey data is used for multiple purposes. First, it documents the pre-removal topographical condition of the creek channel. This serves as a baseline to measure the performance of contaminated sediment removal and creek channel stabilization/backfill activities. To accomplish this, the survey data will then be loaded into the Real-Time Kinematic–Global Positioning System (RTK-GPS) equipment mounted on the excavators used for dredging to guide excavation/backfill efforts and ensure the lateral/vertical extent of contaminated sediment removal and backfill restoration is performed correctly.

3.2 Contaminated Sediment Removal

Sediment at SA1-A will be removed in the same manner as upstream removals that included SA1-C, SA1-B, SA3-A, SA5-A, SA5-C, SA5-D, Axtell creek, and the downstream half of SA6. This approach used a long-reach excavator equipped with an RTK-GPS to excavate sediments, transfer them to a mixing box for further solidification if needed, and load them into tri-axle dump trucks (TDTs) to relocate the material at the John Street TCRA staging for accumulation prior to shipment to either the approved TSCA or Subtitle D landfill as waste sediment characteristics dictate.

Sediment removal will begin in SA1-A at the southern end of the slope area. A long-reach excavator with RTK-GPS equipment will be used to remove sediment from swamp mats placed within the creek channel. Bypass pumping will be performed to maintain creek flow and storm

water drainage. Sediments will be solidified sufficiently in place or in the solidification box to allow TDTs to move material to the John Street TCRA Staging Pad for final dewatering/solidification and subsequent shipment for disposal. Exhumed material will be loaded and shipped to the staging pad. Post-removal sampling and surveying will be performed to verify that cleanup objectives have been met. Once isolated removal area objectives have been met, toe-of-bank stabilization and backfilling will be conducted along with survey verification.

The long-reach excavator may need to work from a timber mat platform to enable excavating under the pedestrian bridge that crosses over Grids SA1-A6 to A9. Material may be loaded into a small track dump truck for transfer to a solidification box. Once the material is solidified, it will be loaded into TDTs and shipped to the staging pad until shipment for final disposal.

3.2.1 Water Management

Bypass pumping operations will begin prior to isolating the dredging area with sheet pile cofferdams. Bypass pumping will operate 24 hours/day, 7 days/week, until the isolated dredging area is dredged, the area is confirmatory surveyed/sampled, toe-of-bank stabilization is completed, and the area is backfilled. Bypass pumping will be terminated during rain and associated flooding events that exceed pumping capacity, and creek flow will be permitted to enter the isolated dredging area; bypass pumping will resume subsequent to flood crest. The discharge of bypass pumping waters will not require a Substantive Requirements Document (SRD).

The isolation area dewatering pumping system will be operated 24 hours/day, 7 days/week, until the isolated dredging area is dredged, the area is confirmatory surveyed/sampled, bank stabilization is completed, and the area is backfilled.

3.2.2 Dredging of SA1-A

3.2.2.1 Sediment Removal

As previously stated, sediment removal in the SA1-A removal area will begin in Grid SA1-A1. EQ will then dredge contaminated sediments from Grids SA1-A1 to A5 subsequent to surface dewatering of the isolated sections. EQ will dredge the isolated areas from swamp mates placed within the creek channel using a long-reach excavator equipped with an RTK-GPS. EQ will solidify sediments in the creek bed or in solidification boxes (as/if needed) to prepare them for transfer to the John Street TCRA staging pad. EQ may use one or a combination of three solidification materials that include Calciment ®, crystallized polymer, and/or corn cob grit. The long-reach excavator will use a smooth-edge bucket to exhume sediments to the target depth in each grid as removal progresses to the north in a downstream direction. Once sediments are sufficiently solidified, the excavator operator will load the TDTs for transfer to the John Street TCRA staging pad.

3.2.2.2 Contaminated Sediment Removal and Transfer to Staging Area

TDTs will back up to the load-out area at the creek side. The load-out area will be covered with plastic sheeting draped back into the active excavation area to allow for containment and recovery of spillage from loading operations. Excavator operators will take special care during loading so as to not spill sediment. Trucks will advance to the tire wash station for tire cleaning prior to departing to the John Street TCRA staging pad. TDTs will follow the prescribed route in the Traffic Control Plan (Revision 2, March 2013) to return to the John Street TCRA staging pad to transfer their sediment waste load. Trucks will travel to the John Street TCRA tire wash station before returning to SA1-A over the prescribed route in the EQ Traffic Control Plan.

3.2.2.3 Post-Excavation Sampling

EQ will support the START contractor in post-excavation sampling of the contaminated soil removal area following the methods and procedures described in the confirmation sediment collection sampling described in the FSP. EQ will provide laboratory analyses through a competitively procured laboratory. Sampling and analyses will be performed in accordance with

the updated QAPP and FSP. Sampling locations will be marked in order to document locations during post-excavation survey operations. The turnaround time for sample analyses will be determined at/or near the time of collection subject to time constraints with other site operations.

Based on observations made and field experience during calendar year 2012, excavation will proceed to the initial target depth; if visual contamination is still apparent in the grid(s), samples will be collected in every other grid of the slope area to verify remaining contamination. If over-excavation is warranted in a particular grid(s), it will be over-excavated until visual evidence of paper sludge or contaminated sediment has been removed. At that time, samples will again be collected in each grid. If cleanup performance standards/goals are met in each grid, work will proceed with backfilling the excavation. If any grid fails to meet performance standards/goals, the excavation and sampling process will be repeated as needed (or as directed by the EPA OSC) prior to backfilling.

3.2.2.4 Post-Excavation Survey

EQ will coordinate with the EPA OSC to provide post-excavation elevations by taking at least 3 final depth measurements in each grid using the RTK-GPS system on the excavator. EQ will provide the measurements to the EPA OSC to facilitate the required volume removal calculations by the EPA FIELDS Group.

3.2.2.5 Toe-of-Bank Restoration

The floodplain and toe of banks will be restored as described in EQ's Restoration Plan dated September 2011 as well as in a Site-Specific Restoration Plan to be developed in coordination with the landowners.

3.2.2.6 Backfill of Creek Bottom and Floodplain

EQ will deploy backfill using rip-rap, river rock, and a sand-and-gravel mix (bank run) to backfill the creek bottom in accordance with EQ's Restoration Plan.

3.2.2.7 Post-Backfill Survey

EQ will coordinate with the EPA OSC and EPA FIELDS Group to conduct post-backfill surveying of SA1-A. The EPA FIELDS Group will prepare as-built drawings and make required volume removal calculations.

3.2.2.8 Post-Sediment Removal Condition Assessment

EQ will provide a structural engineer to perform a post-sediment removal assessment of constructed features in and adjacent to the creek channel excavation areas. Details of this assessment will be provided in a report prepared by a professional engineer. The report will identify the same structural features presented in Table 3 along with any impacts of dredging operations on the constructed features.

3.2.3 Site Restoration

3.2.3.1 Removal of Excavation Facilities and Equipment

EQ will remove non-essential facilities and equipment from the work area to restore the site to its pre-existing condition. The fuel tanks, excavation equipment, tire wash station, cofferdams, pumps, pipelines, etc., will be removed.

3.2.3.2 Restoration Planting

EQ will perform restoration planting as described in EQ's Restoration Plan. The final Site-Specific Restoration Design Plan will include stakeholder input by landowners.

3.2.3.3 Restoration Planting Monitoring

EQ will provide monitoring and corrective action/maintenance for a period of 1 year from the restorative planting date or as directed by EPA in accordance with EQ's Restoration Plan. EQ will also maintain erosion sediment controls until re-vegetation planting is accepted or as directed by EPA.

3.2.3.4 Facility Impact Repair

EQ will make repairs to the sediment removal sites caused by sediment removal operations. EQ, EPA, and the appropriate property owner stakeholder will review pre-existing photo-documentation to develop a punch list of any necessary repair items to be addressed prior to complete demobilization from the SA1-A contaminated sediment removal area. EQ anticipates (at a minimum) that this will include landscaping of disturbed areas, asphalt/concrete patching, and general housekeeping.

ATTACHMENT A

FIGURES

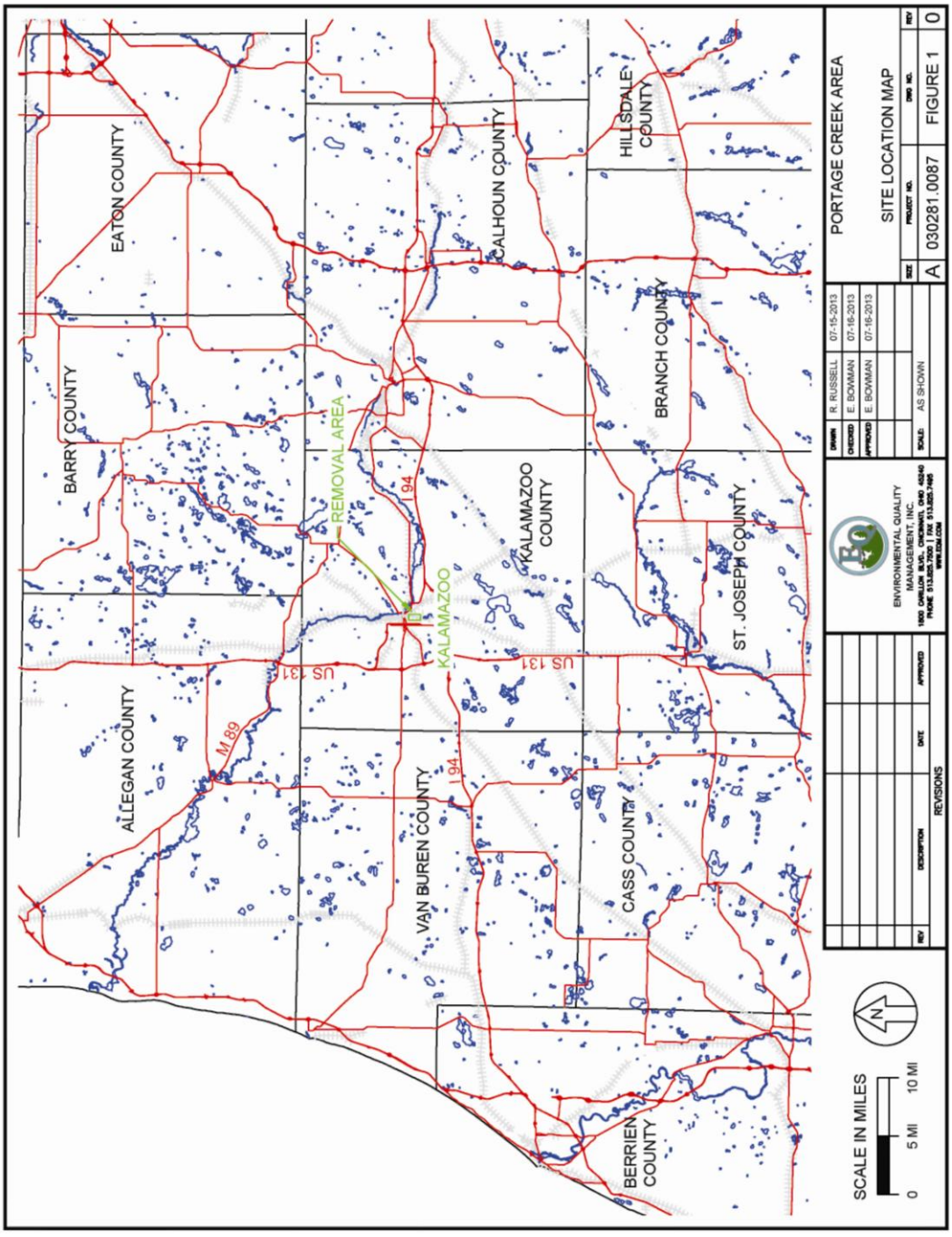

Figure 1. Site Location map

Figure 2. Site Plan

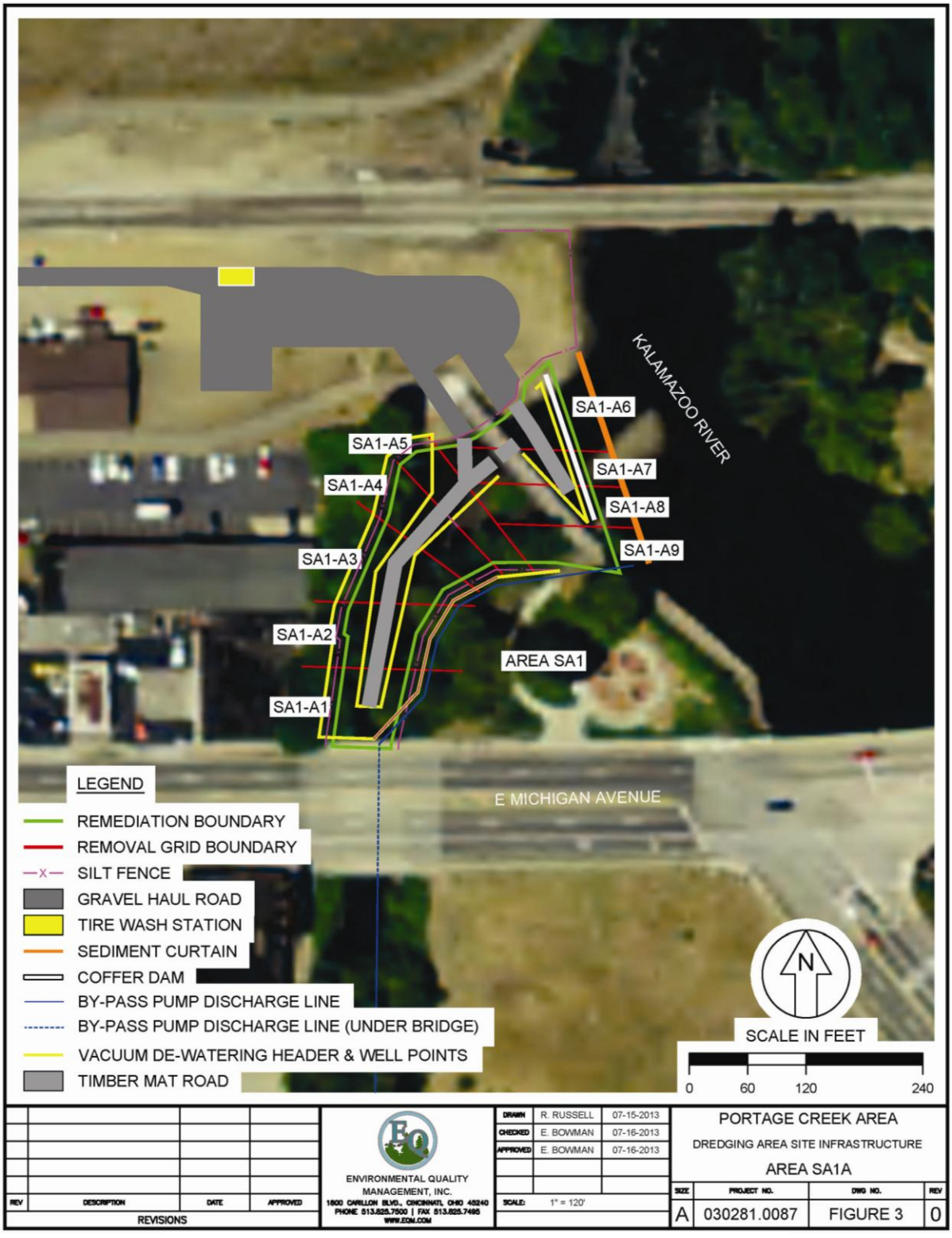

Figure 3. Dredging Area Site Infrastructure
Note: Upstream (south) coffer dam not shown